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Reference book not to be taken from the Library.

GENERAL NOTE

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1 Standard Frequency Radio Transmitting Stations

If every radio transmitting station maintained exactly the wave frequency assigned to it, there would be available a standard frequency wave every time any station was in operation. However, at present this is the case only with certain stations, and because it is a matter of difficulty to maintain exactly the assigned frequency, and also because this is of great importance, the Bureau has been collecting some interesting data on the subject. As a result of these measurements it is possible to give out information from time to time on stations which maintain a sufficient accuracy to be useful as frequency standards. Several stations, which use special means for maintaining constant frequency, have very nearly attained the goal of remaining within 2 kilocycles of the assigned frequency, as recommended by the Second National Radio Conference.

At this time it is possible to give data on the following stations, the transmissions from which may be used in standardizing wavemeters and other apparatus, by the methods given in Bureau of Standards Letter Circular 92, "Radio Signals of Standard Frequency, and their Utilization." Data on other stations will be issued from time to time as the work progresses.

Station	Owner	Location	Assigned Frequency kc	Period covered by measurements	Number of times measured	Greatest deviation	Average deviation
WQL	R.C.A.	Coram Hill, L.I.New York	17.13	Aug.24-Oct.12	16	1.2%	0.3%
NSS	U.S.N.	Annapolis,Md.	17.48	" "	30	0.5%	0.2%
WQK	R.C.A.	Rocky Point, L.I.New York	18.21	" "	22	0.4%	0.2%
WGG	R.C.A.	Tuckerton, No.1, N.J.	18.85	" "	36	0.4%	0.1%
WSO	R.C.A.	Marion, Mass.	25.80	" 27- "	36	0.6%	0.2%
WGY	G.E.	Schenectady, New York	790.	June to Oct.	34	0.5%	0.2%
KDKA	W.E.M.	E.Pittsburgh, Pa.	920.	" "	30	0.6%	0.3%

R.C.A. = Radio Corporation of America
U.S.N. = U. S. Navy
G.E. = General Electric Co.
W.E.M. = Westinghouse Electric & Mfg. Co.

2 A Method of Measuring Very Short Radio Wave Lengths and Their Use in Frequency Standardization

A paper by F. W. Dunmore and F. H. Engel, describing one method of establishing frequency standards employed by the Bureau has recently been published in the Proceedings of the Institute of Radio Engineers (p.467;October,1923). The method described is based on the direct linear measurement of the wave length of very short standing waves on a pair of parallel wires. The wave lengths measured were from 9 to 16 meters, the currents having frequencies from 33,000 to 19,000 kilocycles per second. The apparatus for generating these ultra-radio frequency currents is described, as well as the details of the method used in measuring the length of the waves which they produce on the parallel wires. A method is also described for calibrating a wavemeter at frequencies from 30,000 kilocycles to 352 kilocycles (10 to 850 meters). This method makes use of the harmonics in a second radio-frequency generating set, one of which, when combined with the output from the ultra-radio frequency generating set, produces a beat note in a receiving set tuned to the ultra-radio frequency. The zero beat note method is used to obtain an exact setting.

3 Description of a Series of Single-Layer Inductance Coils Suitable for Radio-Frequency Standards

The radio laboratory of the Bureau of Standards has prepared Letter Circular No. 103, "Description of a Series of Single-Layer Inductance Coils Suitable for Radio-Frequency Standards" which gives specifications for the construction of a complete series of single-layer inductance coils suitable for radio-frequency standards. The series consists of seventeen coils having a constant ratio between the successive values of inductance, and the coils are designed to cover the inductance range from 8 to 5000 microhenries.

4 Tests of Radio Receiving Sets (III)

The results of tests on radio receiving sets made by the Bureau of Standards are given in a series of letter circulars now being issued. The first of this series is Letter Circular No. 90, which gives results of tests on certain electron tube receiving sets. The second, Letter Circular No. 93, describes the results of tests on receiving sets using crystal detectors. The third paper of the series, Letter Circular No. 102, has just been issued and describes results of tests on a number of short-wave regenerative receiving sets. It is believed that the methods followed and the examples given in these reports will be of assistance to manufacturers in the development of methods of testing and describing and improving their products. The particular receiving sets are referred to by arbitrary reference numbers rather than by a statement of the manufacturers' names and type numbers.

These letter circulars have been issued in mimeographed form, but a limited number of copies are available for distribution to testing laboratories, manufacturers, and others who can show that they are directly concerned with the testing of receiving sets. Requests should be addressed to the Bureau of Standards, Washington, D. C.

5 Sources of Radio Information

A considerable number of inquiries received at the radio laboratory of the Bureau of Standards call for similar elementary information regarding radio publications, radio laws and regulations, station and operator's licenses, and call books. In order to facilitate the handling of these inquiries, Circular No. 122 was prepared and recently revised. The new edition gives the more important radio periodicals, lists the important Government radio publications, and the radio books of general interest issued by various publishers, gives a brief summary statement regarding the radio laws and regulations of the United States and Canada, and gives a map showing the radio inspection districts. A copy of the second edition of Bureau of Standards Circular No. 122 may be purchased for 5 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

6 Regulations for Radio Antennas

It is intended to include in the next edition of the National Electrical Safety Code some regulations for the construction of outdoor radio antennas. A subcommittee to deal with this subject held its first meeting at the Bureau of Standards on October 19 under the chairmanship of L. E. Whittemore of the Department of Commerce. Other members of the Committee are C.K.Ahearn, Superintendent of Fire Alarm, Waterbury, Conn; H.J.Burton, Consumers Power Company, Jackson, Mich; L.W.Chubb, Westinghouse Electric and Manufacturing Company; J.A.Cook, New York Edison Company; W.M.Craft, American Telephone and Telegraph Company; J.H.Davis, Baltimore and Ohio Railroad; and H.C.Wolf, Maryland Public Service Commission. Messrs. Guthrie, Doyle and Tesch of the Radio Corporation of America and Messrs. C.B.Jolliffe and M.G.Lloyd of the Bureau of Standards were also present at the meeting.

The Committee outlined proposals for the regulation of antenna construction and after further consideration these will be reported to the large Sectional Committee which is carrying out this revision of the Electrical Safety rules according to the procedure of the American Engineering Standards Committee.

7 Salinity of Sea Water

The Bureau of Standards has developed an apparatus and procedure for its use by means of which the salinity of sea water may be determined readily on board ship. This work was undertaken at the request of the Committee on Instruments, Apparatus and Measurements of the Interdepartmental Board on International Service of Ice Observation, Ice Patrol, and Ocean Derelict Destination, and the apparatus is for use on one of the Coast Guard cutters when on ice patrol duty.

The proportion of salts in sea water varies with time and location as a result of evaporation from the surface and dilution with fresh water. Increase or decrease of the salt content makes a corresponding change in the electrical conductivity, but the indications are made to show directly the corresponding amount of salts present in the water.

This procedure is much quicker and more convenient than the usual chemical titration method. It is intended to enable the scientific observer on the ice patrol work to determine the salinity of samples of sea water as taken or whenever he may desire, rather than only at the end of the season. Thus the data can be made immediately available in case it should be found that a knowledge of the salinity may help in detecting changes in conditions, such as shifts of currents, the approach of ice floes or bergs, or other changes affecting navigation.

The conditions on board ship at sea are by no means favorable for the making of precise electrical measurements, but a preliminary test of the apparatus indicates that it will function properly and give reliable results even under these conditions.

8 Standards of Radiation Intensity

For a number of years the Bureau has been investigating the instruments and methods used in radiometry, and during the past nine years it has provided investigators with standards of radiation intensity in absolute value. These radiation standards are of use to biologists, physiologists, psychologists, and others, to standardize the light stimuli employed in their investigations. In this way the work throughout the country is becoming systematized and specified on a reproducible basis.

During the past year there has been a greatly increased demand for these radiation standards, which consist of seasoned carbon filament incandescent lamps calibrated for radiation intensity (radiant power in watts per sq. mm. at a given distance from the lamp) when the lamp is operated on a given energy input. Last month considerable time was spent in comparing several dozen newly prepared radiation standards with the primary standards of the Bureau. The comparison is made by means of a thermopile in connection with a d'Arsonval galvanometer. The results obtained from day to day are in agreement to within 0.1 to 0.2 per cent. An interesting observation is the constancy of the galvanometer deflection. For a period of over five days, on resetting a certain primary standard and operating it on a given energy input, the scale distance and radiometer (galvanometer and thermopile, in air) remained so constant that the same galvanometer deflection was obtained to within 0.5 per cent.

9 The Visibility of Radiant Energy

Scientific Paper No. 475 of the Bureau of Standards has recently been issued and deals with the visibility of radiant energy or the ratio of light to radiant power throughout the spectrum. This ratio is sometimes called the luminous efficiency of the spectrum, and an accurate knowledge of it is of great importance in studying the efficiency of all kinds of light sources. Since the visibilities of different individuals will as a rule vary within certain limits, a determination of the average visibility must be statistical, and the more observers studied the more truly will the final values obtained represent the average for all observers.

Several determinations of this average visibility have been made in the past, but rather large discrepancies appeared between the results of the different investigations. The question of the photometric method employed also enters into the problem - are the results obtained by the flicker photometer equivalent to those obtained by the ordinary equality-of-brightness photometer?

The National Lamp Works of the General Electric Company considered this subject of sufficient importance to cooperate in a new determination of the average visibility at the Bureau of Standards, and 52 observers were employed. The results which form the basis of this paper, together with data from previous investigations, have permitted the plotting of the visibility curve for the average observer with a

certainty sufficient for all ordinary purposes.

This paper may be obtained from the Superintendent of Documents at 15¢ per copy.

10 The Resolving Power of Optical Instruments

The Bureau has designed an improved apparatus for determining the resolving power of optical instruments, including the eye, under varying degrees of illumination intensity and contrast. It is hoped that this apparatus will be useful in determining the effects of striae in optical glass on the definition of the instrument in which such glass may be used, and also in determining the harmful results of known quantities of various aberrations present in optical systems.

11 Device for Testing Electric Fans

In connection with the work of the Federal Specifications Board, the Bureau is designing a device for the rapid testing of electric fans. The usual test of the air delivery of electric fans is very unsatisfactory, because it takes considerable time, and the results can not be repeated with accuracy.

It is believed that these objections have been overcome in the device now being worked out, the principle of which was tried and found workable some time ago. The present work is directed toward applying this principle in a more convenient form for field use.

12 Tests of Elevator Interlocks

In cooperation with municipal authorities of Baltimore, Md., the Bureau has been conducting some tests of elevator interlocking devices. During the month a number of interlocks which had previously failed to meet the requirements were retested. One additional device met the test conditions, bringing the total number of those which have successfully passed the tests to seven. Included in this number are three interlocks of the mechanical and four of the electro-mechanical type.

The successful results of the tests of these seven devices have been certified to the Inspector of Buildings of Baltimore, who has formally approved them for use in that city by publishing an "approved list" of interlocks.

The success of this work has been largely due to the interest taken in the subject by the Building Owners & Managers Association of Baltimore, this organization having been particularly helpful in the early stages of the investigation.

The actual tests have been carried out on a special device designed and constructed at the Bureau which automatically performs the functions of an elevator and operator and which records automatically any failure of the interlock being tested. This device has been in service for about a year and a half and has greatly expedited the work.

No report of the Bureau is at present available on this investigation.

13 Tests of High Speed Steels

Two series of tests on high speed steels have been completed by the Bureau and a third series has been outlined. The tentative program for this work includes performance comparisons of commercial high speed steels in cutting carbon, nickel, chrome-nickel, chrome-vanadium, and chrome-molybdenum steels heat treated in various ways. The lathe tools are now being prepared, and several manufacturers of structural steel have promised to supply sufficient material for the required test logs. It is hoped to carry out the work in such a manner as to throw some light on the ease of machining various alloy steels heat treated to show equal hardness.

A set of high speed steels of special composition is also being prepared in the high frequency induction furnace, as it is planned to test steels having quite different chemical composition from present commercial types, to determine the effects of added elements to the usual chrome-tungsten-vanadium steels.

In order to supplement tests already carried out on "flaky" high speed steels, thermal analyses were made of twelve samples intentionally flaked by repeated quenching. No marked differences in the thermal arrests were observed except in one case. Samples quenched three times from either 1260° C or 1350° C showed no evidence of the Ac_1 transformation on reheating, whereas steel which was first quenched from either of these temperatures once, twice, or five times clearly showed this transformation at about 423° C.

14 Effect of the Character of Steel Upon the Results Obtained in Carburizing

Samples of various "normal" and "abnormal" steels submitted to the Bureau by different manufacturers have been carburized and examined microscopically. The structural characteristics of these carburized steels confirm the contention that there is a difference in the "carburizing properties" of steels which show but little difference in their composition as ordinarily determined. These differences consist in variations in the average depth of penetration, as well as in the character of the pearlite. The real significance of the differences, so far as commercial practice is concerned, is still a matter of surmise. The work is being continued, and special attention will be given to the "carburizing behavior" of a set of irons containing unusual impurities such as oxides, nitrogen, etc., in appreciable amounts.

15 New Glycerin-Water Quenching Medium

In connection with the Bureau's investigation of steels for the manufacture of precision gages, an effort has been made to find a quenching medium intermediate between oil and water. During the past month, quenching curves were taken of specimens cooled in water solutions of glycerin. Such solutions fill the gap effectively, so far as the cooling rates at high temperatures are concerned. On the

other hand, glycerin and its water solution cool distinctly faster in the lower temperature ranges than quenching oil. This appears to be a desirable property. As a commercial quenching medium glycerin or its water solutions should not be unduly expensive, for although the first cost is high, glycerin does not decompose to any great extent on heating, as is the case with oils. The composition of glycerin water solutions may be easily maintained by hydrometer tests. They do not give off irritating fumes and are harmless to the worker, in contrast with concentrated sulphuric acid sometimes used for this purpose.

16 Analysis of Chrome-Vanadium Steel

The analysis of chrome-vanadium steel, by G.E.F.Lundell, J.I.Hoffman, and H.A.Bright, has recently been published in Journal Industrial and Engineering Chemistry, Vol. 15, page 1064. This article may be summarized as follows:

"Particular attention is paid to the determinations which are troublesome in the analysis of chrome-vanadium steel - namely, chromium, vanadium, and manganese. The methods described and the observations recorded are largely the result of work done in standardizing the Bureau of Standards alloy steel samples by analysts at the Bureau of Standards and in laboratories that have cooperated with the Bureau."

17 Stresses in Welded and Riveted Steel Tanks

A description was given in Technical News Bulletin No. 71 (Item 12) of the work carried out at the Bureau last winter on stresses in welded and riveted steel tanks under Hydrostatic pressure. The results of this investigation have now been published as Technologic Paper No. 243, for sale at the Superintendent of Documents at 5¢ per copy.

Four steel tanks, 4 feet in diameter and 10 feet long, made of 5/16" mild steel plates, and designed for a stress of 16,000 lb. per sq. in. at 200 lb. working pressure, were used in these tests. Two of the tanks were butt-welded, one was lap-welded, and the fourth was of the ordinary lap-riveted construction. The ends of the tanks were spherical, having a radius of 4 feet.

Strain gauge measurements were made at various portions of the tanks and at pressure increments of 50 lb. per sq. in. until failure. The results of the hydrostatic tests proved rather unsatisfactory as a comparison of the relative strengths of the different types of construction. Due to secondary failures, such as leaks around the fittings, the possible strength of the tanks was not reached. In fact, the secondary failures were responsible for failure in each case. In one tank the failure was at the weld around a 2-inch pipe outlet; in the second, at the manhole; in the third, at the end transverse weld, and in the riveted tank at the end transverse riveted joints. The first two failures might have been obviated by better welding of the pipe fittings and manhole

saddle to the shell. Extra reinforcement at the junction of the spherical end to the cylindrical shell would have reduced the stresses at the junction where the other two tanks failed. The location of the end transverse seam or riveted joint farther back on the shell of the tank would have taken this joint out of the region of high stress intensity caused by the abrupt change in direction of force at the junction of the spherical end of radius 4 feet to the cylindrical shell of radius 2 feet.

As the results of the analysis of the deformation and distribution of stress in these tanks, the following general conclusions seem warranted:

1. The commonly accepted theory for the design of tanks is, for all practical purposes, sufficiently accurate, provided the computed stresses are not influenced by secondary stresses.

2. For thin tanks, the measured stresses, based upon the two-dimensional formula, are in close agreement with the design stresses computed by the common-pressure formulas, provided the former are not affected by secondary causes. This is borne out by the results obtained at the center of the end.

3. Secondary stresses resulting in high stress intensity were caused by (a) faulty design of the attachment of the spherical end to the cylindrical shell, (b) nonconformity of the shell to an accurate circular section, and (c) discontinuities in the shell for the manhole and fittings. These may produce a possibly dangerous condition if present near a welded or riveted joint or seam.

4. The stresses were increased by the presence of a seam.

18 Tests of Caustic Magnesia Made From Magnesite from Several Sources

The results of a part of the Bureau's work on oxychloride cement are contained in Technologic Paper No. 239, which may be obtained from the Superintendent of Documents at 10¢ a copy.

Comparatively few users of this material are really familiar with it. Even among architects and builders oxychloride cement products are often known only in connection with trade names. The rapidly increasing demand for these materials shows that they possess certain desirable peculiarities, and has made it necessary to replace haphazard or "rule of thumb" methods in the manufacture and use of this cement with more scientific methods based on the study of numerous tests.

Caustic magnesia, the chief constituent of oxy-chloride cement, was made in the experimental cement plant of the Bureau of Standards by calcining magnesite ore. The temperature and other conditions were varied in order to study the effects on the properties of the product. An ore im-

ported from Greece, one shipped from the State of Washington, and two from different mines in California were used, as these were representative of the chief sources of supply for this country. Cement mixtures, typical of those used by the trade, were then made, and tested both in the laboratory and on panels of flooring and stucco exposed to actual service conditions.

The results of this work form an important contribution to the information necessary for the production of the most satisfactory oxy-chloride cement products.

19 Tension Tests of Limestone

The Bureau has recently completed some tension tests on samples of Indiana limestone. This is a novel form of test for a material of this kind, the work having been undertaken in connection with the design of lifting devices used in hoisting large blocks of stone at the mills, and also when being placed in buildings. The tensile values for the specimens tested ranged between 300 and 715 lb. per sq. in. with an average of 535 lb. per sq. in.

20 Improved Apparatus for Testing Bricks

An improved apparatus for the transverse testing of brick has been designed by H.L. Whittemore of the Bureau of Standards. During the past month 500 brick were tested to determine whether this apparatus was superior to that specified by the American Society for Testing Materials. 250 brick were tested in each apparatus. The bricks were of 3 different kinds, 200 being clay brick, 200 cement, and 100 sand-lime brick. The average results were practically the same for both types of testing fixtures, but with the Whittemore apparatus it was possible to test 100 brick in 3 hours, while 5 1/4 hours were required to test the same number with the A.S.T.M. fixtures. With the latter apparatus, 5 pieces are displaced when a brick is broken, and these must be accurately replaced in position for the next test. There are no displaced parts when a brick is broken in the new holder. Since both devices give equal results for the modulus of rupture of a brick, and since the A.S.T.M. fixture requires more time, the new apparatus is evidently an advance in the field of testing equipment.

21 Rate of Drying of Wall Plaster

The Bureau receives numerous inquiries as to when plaster can be painted safely. A careful study of this subject led to the conclusion that plaster can be painted safely when dry. The next question is how long does it take plaster to dry? This is of importance, not only as regards painting, but also in the erection of wood trim, and because of its effect on the general speeding up of construction. A slow-drying plaster may cause financial loss to the contractor because of delay in completing the work, and it may cause loss of occupancy to the owner.

Plans have therefore been made to measure the relative rates of drying of different kinds of plaster under different atmospheric conditions. The equipment necessary for this research has been designed, and is now being made in the Bureau's shop.

22 Development Test for Hardness of Glazes and Investigation to Increase the Hardness of These Glazes

The Ceramic Division of the Bureau of Standards is developing a hardness test for porcelain glazes which consists essentially in wearing away the glaze by means of a standard sand which is allowed to run through an orifice of known dimensions and to strike upon the inclined surface of the specimen after falling a predetermined distance. Satisfactory results are being obtained in comparatively short intervals of time and with small amounts of sand, both being well within practical limitations. A circular letter has been sent to a considerable number of potters asking that samples be submitted for testing.

23 Refractories for Stoker-Fired Boiler Settings

In cooperation with an advisory committee composed of producers and consumers of refractories, the Bureau of Standards has undertaken the establishment of specifications to be used by the Government departments in the purchase of these materials.

An important part of this work which is now nearly completed deals with refractory brick for the lining of stoker-fired boiler settings. Brick of many representative brands were subjected to tests suggested by the advisory committee, and the results of these laboratory tests were then correlated with service records on brick of the same brands, gathered from various power plants.

The brick tested represented 42 brands supplied by users in all of the important industrial districts of the country. Specimens have been subjected to the standard and modified load tests, and the endurance, constant volume, and quenching tests. Absorption tests before and after various heat treatments were carried out, and the fusion points and chemical composition were also determined.

The results of the load tests checked closely those obtained in previous investigations and show clearly the relative behavior of brick from various districts in the United States. Results of the investigation also indicate a close relation between chemical composition, fusion point, and resistance to sudden temperature change, and these also agree quite satisfactorily with the results of the endurance and constant volume tests.

The laboratory work has been completed, the necessary service data obtained, and the results correlated. Proposed specifications were drawn up during the past month and discussed on October 23 at a conference composed of the

Federal Specifications Board's subcommittee and the advisory committee on refractories. It is evident that a most important advance step has been taken in preparing a set of specifications based on the results of service tests rather than merely the quality of the material.

24 Recent Publications in Ceramics

The following publications dealing with the work of the Ceramic Division have been prepared or appeared in print during the month:

"The Microscopic Identification of Stones in Glass", by H. Insley, has been submitted to the Journal of the American Ceramic Society.

An article entitled "Progress Report on Specifications for Refractories," by R.F. Geller, was published in the October number of the above journal.

"Some Relations of Composition and Properties of Sheet Steel Enamels," by P.R. Danielson and B.T. Sweeley of the Coorley Manufacturing Company was published in the Journal of the American Ceramic Society Vol. 6, No. 10,1923.

25 U. S. Government Specification for Water-Resisting Red Enamel

Circular No. 146 of the Bureau of Standards, which may be obtained from the Superintendent of Documents at 5¢ per copy, consists of the latest U.S. Government Specification for Water-Resisting Red Enamel. The specification was prepared by the technical committee on paints of the Federal Specifications Board after careful consideration of suggestions from manufacturers. Highest quality red enamel suitable for outside use is called for. This consists of pure toluidine red toner in a vehicle of the very best water-resisting long oil spar varnish. A general description of the enamel is followed by detailed directions for sampling and testing, including tests for caking in container, working properties, color, hiding power, weight per gallon, coarse particles and skins, identification and determination of pigment, nonvolatile matter, drying time, water resistance, and toughness.

26 U.S. Government Specification for Gloss Interior Lithopone Paint, White and Light Tints

The U. S. Government's specification for gloss interior lithopone paint, white and light tints, has just been issued as Circular No. 147 of the Bureau of Standards, and may be obtained from the Superintendent of Documents at 5¢ per copy.

As in the case of Circular No. 146 this specification was prepared by the technical committee on paints of the Federal Specifications Board, after carefully considering suggestions from manufacturers of this material. The specification covers paints not intended for outside exposure, that will dry to gloss opaque coats which will adhere well to wood, metal, and plaster, stand washing with soap and water, and show no material change in color on exposure to light, or material yellowing when kept in the dark.

A general description of the pigment, vehicle and completed paint, which is a lithopone zinc oxide pigment in a vehicle of treated drying oils or varnish, is followed by detailed directions for sampling and testing. The tests cover caking in container, color, weight per gallon, brushing properties, time of drying, resistance to washing, fastness to light, yellowing, determination of water, volatile thinner, percentage of pigment, percentage of nonvolatile vehicle, nature of nonvolatile vehicle, coarse particles and skins, and analysis of pigment.

27 Dynamometer Tests of Automobile Tires

In past issues of the bulletin comment has been made on the work under way at the Bureau in connection with automobile tires. Part of this work has included power-loss tests on a large number of tires of different makes and sizes. The tests are described in Technologic Paper No. 240, recently issued, which may be obtained from the Superintendent of Documents, Government Printing Office, at 10¢ per copy.

From a study of the results, as given in this paper, the following conclusions can be drawn. These are based on: No tractive effort, a speed of 25 miles per hour, and the normal axle loads and air pressures.

(a) The average loss in 30 x 3 1/2 fabric tires is 0.71 horsepower; in cord tires 0.48 horsepower.

(b) The average loss in 4-inch fabric tires is 0.94 horsepower; in cord tires 0.67 horsepower.

(c) As an average, the loss in cord tires is approximately 70 percent of that in fabric tires.

(d) Extreme cases between the highest fabrics and the lowest cords show the cord with only 40 percent of the loss found in the fabric.

(e) Considering only the cord tires, the lowest loss for each size of tire is about 60 percent of that of the highest.

From the study of the causes for these wide differences, it is found that they are largely due to variations in carcass construction. The tread has a small effect and the tube (if of standard construction) very little, if any, effect on the power loss.

A large variation is found in the size of different makes of tires of the same rated size. The oversize or undersize feature has very little effect on the power loss, but has quite a large effect on the load-carrying capacity.

The amount which a tire is deflected, due to the axle load, is not a measure of the power loss. For the same deflection, overloading produces a more severe action on a tire than under inflation.

The power required to supply that absorbed by the tires and dissipated as heat must come from the fuel used, and, accordingly, a change in the kind of tires or the conditions under which tires are run will manifest itself in an increase or decrease in fuel economy. It is not out of the way to attribute a difference in fuel consumption of as much as 10 to 20 percent to changes in tires or tire conditions.

Probably the most important feature of dynamometer tests is that they furnish a means for accurately measuring the internal friction in tires. By means of progressive tests it is possible to closely trace just what takes place inside a tire and actually measure the effect of details of design and thus aid in co-ordinating more closely the different parts.

28 Meeting of Advisory Board on Dictionary of Specifications

A meeting was held on October 24th of the Board organized to act in an advisory capacity to the Department of Commerce in compiling material for and publishing a handbook of specifications for commodities purchased by federal, state and municipal governments and public institutions. As was mentioned in last month's Bulletin, there are more than 20,000 commodities which can properly be classed as articles purchased out of taxes for which there should be specifications, whereas there are now in existence less than 5000 specifications for such commodities.

At the meeting of the Advisory Board, at which there were present representatives from all but one of the organizations represented on the Board, unanimous approval was voted for the proposed plan for issuing shortly in convenient form a thoroughly classified list of all known existing commodity specifications.

The Board voted unanimously for the creation by the Secretary of Commerce, as Chairman of the Board, of three committees from its membership to render reports for the approval of the Board on the subjects of (1) classification of commodity specifications; (2) form and size of the publication; and (3) scope of the proposed handbook or encyclopedia of specifications.

It was the unanimous opinion of the Board that future meetings should be subject to the call of the chair.

29 Meeting of the National Screw Thread Commission

A meeting of the National Screw Thread Commission, of which the Director of the Bureau of Standards is Chairman, was held in New York on October 8 and 9. The first day was devoted to a hearing on wire and sheet metal gages, and the second to preliminary consideration of data relative to stud fits, and to revision of the Progress Report of the Commission.